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# **FACILITATING DISCUSSION OF VIDEO WITH TEACHERS OF MATHEMATICS: THE PARADOX OF JUDGMENT**

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*This report details findings, related to the role of the facilitator, from a UK government-funded project to promote the use of video clubs for the professional development of teachers of mathematics. Seven teachers met on six occasions, over a three-month period, and shared video recordings of their own classrooms, all meetings were themselves recorded. While it is a common finding that discussion norms can be hard to establish, participants adapted to intended norms from the first meeting. The way this was achieved is analysed, within the enactivist methodology of the project. There is an apparent paradox that a move away from judgment is achieved through the use of judgment. Bateson's (1972) levels of learning and communication are offered as one explanation of the observed phenomena.*

## **INTRODUCTION**

This report details results, relevant to the role of the facilitator, from research into the professional learning of teachers of mathematics, funded by the UK's Economic and Social Research Council (ESRC). The aim of the research is to investigate effective use of video for teacher learning, building on previous work conducted by the Principal Investigator (Coles, 2013, 2014) and to promote and support such use via the creation of 'video clubs' in the UK and beyond.

The video clubs, as conceived in this research, last over a three-month period with participants meeting fortnightly on six occasions. The clubs are partly inspired by those run in the USA (e.g., van Es et al., 2014). This report is based on outcomes from a video club that ran between May and July 2015. There were seven participants (all volunteers). Participation in the club is free, but a commitment is required to attend and engage in activities (most importantly video recording of their own classroom) between meetings. The number of participants could be up to ten, based on principles of collaborative group-working (Brown and Coles, 2011). The video club was framed around an action research text (Altrichter, Posch and Somekh, 1993) and participants were asked to come to the first meeting having read the first chapter and engaged in an activity (from the book) to help them find or refine an issue in their teaching they wanted to develop or investigate. In other words, the video clubs were not set up with any particular pedagogical focus in mind, but instead with the aim of supporting each participating teacher in developing their own practice.

After a review of literature on the use of video, the enactivist methodology of the project is described briefly. Results are then presented and analysed, prompting further theoretical discussion in order to offer an explanation of those results.

## USING VIDEO

In reviewing the history of the use of video for teacher learning, Sherin (2007) cites reports going back to 1966 that found mixed results in terms of effectiveness (McIntyre, Byrd and Foxx, 1966). Sherin (2007) suggested more empirical work was needed to gain appreciation of possible roles for video – work that she herself has continued to conduct (e.g., Sherin and van Es, 2009). It is only relatively recently, however, that there has been a sustained interest in investigating the role of the facilitator of discussion, when working on video with teachers (Borko, et al., 2011; Coles, 2013; van Es, et al., 2014; Zhang et al., 2011). This report contributes to the emerging field exploring the skills needed to facilitate discussion.

There are many methods proposed for using video with teachers (e.g., Star and Strickland, 2008; Santagata and Angelici, 2010). My own use of video is drawn from Jaworski (1990) and involves using 3-4 minute clips, where the first task for participants is to reconstruct (without interpretation or judgment) what happened, before any move to accounting for events is allowed (see Coles, 2013).

More recently, frameworks have been suggested to support facilitators. Due to space limitations, just two of these frameworks will be described briefly below (chosen for their relevance to this study). At present, a common (and unsurprising) feature of frameworks relevant to facilitators is that they come out of particular uses of video. This report attempts to draw out issues around the facilitation of video that are potentially independent of the particular method of video use being employed.

van Es et al., (2014) analysed discussion in their own video clubs and identified four categories that represented key strategies used by experienced facilitators during high quality discussions (defined as those discussions where there was sustained engagement in making sense of students' thinking or participants' own thinking). These four categories are: orienting the group to the video analysis task; sustaining an inquiry stance; maintaining a focus on the video and the mathematics; supporting group collaboration (van Es et al., 2014, p.347). A list of decision-points for the facilitator in Coles (2013) shares many aspects of the van Es et al., framework. In Coles (2013), the following five decision-points are identified: selecting a video clip; setting up discussion norms; re-watching the video clip; moving to interpretation; metacommenting.

Common to both frameworks is: (i) the importance of establishing a mode of talk, whatever that mode is, (orienting the group to the task; setting up discussion norms); and, (ii) helping participants make links to their own practice (sustaining an inquiry stance; moving to interpretation). One other issue relevant to this report that has arisen from a recent review of video use, not just within mathematics education (Gaudin and Chalies, 2015), is the cognitive load of video viewing and the problems, particularly with beginning teachers, in their 'capacity to identify and interpret classroom events' (Gaudin and Chalies, 2015, p.29).

## ENACTIVISM AS A METHODOLOGY

The methodology behind the project was enactivist (Reid and Mgombelo, 2015). Enactivism is a research stance that offers a way through the philosophical and practical pitfalls of the subject-object divide, and all it entails, through collapsing knowing, doing and being (Maturana and Varela, 1987). From an enactivist stance, ‘all doing is knowing and all knowing is doing’ (ibid, p.27). What we think of as ‘subject’ and ‘object’ arise together in patterns of co-ordinated activity, each one (co-)determining the other. All perception is an active process – perhaps easy to acknowledge with touch but maybe harder to notice with vision.

We say that someone (including ourselves) knows something if we observe them acting in an ‘adequate’ manner in an environment. Knowing is therefore never fixed, never certain and alters in each expression. Knowing cannot be separated from acting and our whole being. We acknowledge learning when we observe someone acting differently in a similar context (perhaps moving from inadequate to adequate action).

The implications of the enactivist stance for the doing of research were explored in a special issue of *ZDM, The International Journal of Mathematics Education*, volume 47, issue 2. Of relevance here is an enactive approach to studying language (Coles, 2015), since the data from this project is recordings of talk. Analysis was conducted beginning with a search for patterns in the last piece of data collected, on the principle of equifinality (see Coles, 2015 for one description of this principle). In this project, in the final meeting of the club, participants were invited to reflect on what they had learnt and anything significant they would take away from having attended meetings. A pattern observable during this conversation was that *every* participant mentioned something related to questioning their own immediate ‘judgment’ of situations, or the difficulty of not interpreting events to fit one’s ideas. A random selection of comments is below (phrases linked to judging are underlined).

‘From that very first session when we watched that video and I think that’s the one thing I’ve picked up most from this club is understanding how you doctor what you watch unintentionally’ (Teacher N)

‘Just that judgment, being judged and judging ... After we watched that first [video] ... we were making judgments ... but then that wasn’t really reflection’ (Teacher J)

‘At the very beginning I found it so difficult just to be objective and I have realised that this is a direct reflection of how I am in the classroom. I listen to children and sometimes I don’t listen to the question for the question’s sake, and move it on, trying to keep that pace high.’ (Teacher T)

Having identified a theme, the enactivist approach in Coles (2015) is to trace mention of this theme through earlier sections of data. The aim is to follow the emergence of the theme rather than account for patterns in a directly causal manner. So, starting at the first meeting any mention of judgment, or difficulties with interpretation, in the audio recordings were transcribed; the aim is to uncover further patterns related to the role of the facilitator (which is the focus of the research project).

## FACILITATING THE MOVE AWAY FROM JUDGMENT

A striking feature of the comments reported above (from meeting 6) is the number that refer back to the first meeting. It appeared as though a significant shift took place during the first meeting, in relation to the move away from judgment. This first meeting would have been the starting point for analysis anyway, and in this section the focus is just on that meeting. Three transcripts are reported, which are all the instances where a comment from a participant gets interrupted or re-focused by the facilitator, in relation to judging/interpreting. Given the focus of this report on the decision-making of the facilitator (in this case, me), the three transcripts are presented in the form of a narrative, combining what was said with my own, stimulated-recall of the events. After the three transcripts/incidents I offer some further reflections.

### Incident 1

In the first meeting, having had some time discussing how the group would operate and hearing what participants had done on the pre-meeting tasks, we moved to watch our first video. No participants were expected to take video recordings of lessons before this meeting and so I chose a video clip from the Video Mosaic database ([www.videomosaic.org](http://www.videomosaic.org)) called 'Alan's Infinity'. I have used this clip before and am aware it can provoke strong responses (both positive and negative) and so hoped it would be suitable to establish the discipline (Jaworski, 1990) of starting work on video with the detail of what took place, without initially straying into interpretation.

I was explicit that the initial task would be to simply say what participants saw on the video. I let the video run, pressed stop and as I was returning to my seat one teacher (P) began talking. The first comment, below, refers to teacher J (another teacher in the group) who had mentioned at the start of the meeting that he was interested in promoting more 'independence' in the students he teaches.

[Transcription conventions: //text// indicates overlapping speech; [text] is a transcriber comment; [2] indicates a pause of 2 seconds; other punctuation has been used to give some sense of phrasing; ... indicates some text has been skipped, for ease of reading]

P: I couldn't stop watching, thinking of you [P looks at J] and your independent children  
[Alf raises his hand towards P] and unfortunately all //the children that weren't paying attention//

//Alf: So, so, so//

//J: Yeah, yeah//

Alf: That's an interpretation. So, at this stage, the invitation is to say what you saw, what you observed [1] so [1] how did it begin?

I remember feeling taken aback that P had begun talking before any invitation from me (in which I would usually have re-iterated the task of description and staying with the detail). On reflection, P's comment was, I suspect, extremely helpful to the group in terms of allowing me to give feedback in relation to a discussion norm, from the start. The distinction on offer here is that we cannot observe 'not paying attention'. What we

might see is, say, children looking away or playing with items on a desk or talking – from which it is an interpretation that they are not paying attention.

## Incident 2

My intervention, in Incident 1, did not ensure that conversation thereafter remained at the detail level (and nor would I have expected it to). After 3 minutes the following interchange occurred (G and J are commenting about a student on the video clip).

G: He said that it wouldn't work if your one whole was 10?

J: Yeah, I think he was talking more on the discrete nature of number, he was thinking about things being discrete

Alf: So, try to avoid interpreting what you think he was saying [Alf laughs] try and stay with [1] so, what did you hear him say?

I recognise being attuned, when the task for the teachers is one of description, to any mention by a teacher of what might be going on in the mind of a student on the video. For me, these are the easiest comments to spot that are interpretations and not descriptions. We cannot observe what a student may or may not be thinking, by way of explanation of what they say. So, when J suggests a student was thinking about the discrete nature of number, I am not surprised to observe myself intervening and re-emphasising the discussion norm for this phase.

## Incident 3

A little later in the meeting I do something similar to the first two Incidents, for a third time. P, in the transcript below, begins referring to a student on the video who she had heard talk about 'atoms' (on a number line).

P: Someone started saying about atoms, didn't they.

J: And that other lad saying about a really long number line. He was saying, if you had the longest number line in the world you could.

T: I thought that was interesting because he kind of got it right, it's the same concept//

Alf: //[Alf interrupts T] That // sounds like an interpretation //

J: //Interpretation, yeah//

Alf: Try and stay with the detail, we'll come on to that in a second. Let's try and see if we can get the chronology of things.

A little like comments about what a student might or might not be thinking, any comment evaluating the video, for example, as here whether a student is right or wrong, I recognise as indicating a move into judgment and interpretation. Again, I intervene, in this case interrupting T's contribution, and re-state the task as getting 'the chronology of things', i.e., *what* happened *when* during the clip.

In J's re-voicing of my comment 'Interpretation, yeah' there could be evidence of him beginning to recognise the distinction I am making between interpretations and descriptions. Following this third incident, there are no others where I notice a

judgment and the teacher discussion remains at the level of detail and description (with some re-viewings of sections of video) before I shift to the next phase of asking for interpretations and analysis of what was seen.

### **Further reflections**

The technique of starting with a reconstruction of events was designed precisely to move participants out of ‘judging’ and into a space where it is more likely teachers can learn and observe something new in the video clips they watch (Jaworski, 1990). This is not the end of the process of working on video and, following the ‘reconstruction phase’ there is then an invitation to move into an analysis of the video and a drawing out of implications for participants’ own classrooms; however, the analysis phase is beyond the scope of this report, further details about the entire way of working can be found in Coles (2013, 2014).

There is evidence that a discussion norm (about starting off with description and not interpretation) has been established in the first meeting. After three interventions by me to flag up when discussion has moved to interpretation, no more are needed. It appears that discussion norms *can* become established quickly in a group, with a facilitator prepared to intervene and make the criteria for intervention explicit to the group, so that those criteria can become ones that participants are able to apply to themselves. There is no evidence of the cited difficulties of ‘cognitive load’ (Gaudin and Chalias, 2015, p.29) required for these teachers to work with video and adopt the way of working, even though several of them were newly qualified.

Reflecting on the way this first meeting went, there is a paradoxical sounding sense in which my own judgmental interpretation of the ‘kind’ of comment made by teachers supported them in moving away from their own judgmental interpretations of the video. The nature of this apparent paradox – that the facilitator appears to support participants moving away from judgment through the use of judgment, is not a phenomena I have found reported previously and it is explored in the next section.

### **LEVELS OF COMMUNICATION, LEARNING AND ERROR**

The use of video recordings with teachers of mathematics sets up a context in which there is communication about the communications in the classroom. This report sets up a third level of communication (about communications of video that are about communications in the classroom). In order to help untangle the webs of connections involved and, in particular, the paradox mentioned above, there is a need to draw on theory beyond mathematics education. I have found it instructive to go back to Bateson’s (1972) views on communication, errors and learning, which were an early influence on me and which also form part of the background to enactivism.

Bateson (1972) distinguished three levels of learning to capture how animals (including humans) alter their behaviours over time. Learning 0 indicates the same response (at two different times) to the same stimulus (e.g., the bell rings and the dog salivates; I ask a student what is  $7 \times 8$  and they answer correctly). Learning I indicates

that between time 1 and time 2 there is a change in response to the same stimulus (e.g., the dog learns to salivate on hearing the bell; a student moves from not knowing  $7 \times 8$  to being able to give the correct answer). Learning II indicates a change in the *way* Learning I takes place (e.g., a dog becomes more efficient than it was at learning in the context of Pavlov-style experiments; a student moves from memorising discrete multiplication facts, to being able to use commutativity and ‘doubling’ of known facts to derive others). Learning II is only observed in animals able to engage in communication about communication and cannot be taught directly since it cannot be specified by particular behaviours. Learning II concerns *how* we learn new behaviours, not the behaviours themselves.

These considerations indicate there are two kinds of error an organism can commit, where ‘error’ is interpreted as an action that is not well adapted to the context:

The organism may use correctly the information which tells him (sic) from what set of alternatives he should choose, but choose the wrong alternative within this set; or

He may choose from the wrong set of alternatives. (1972, p.291)

Errors of the first kind, if corrected, can lead to Learning I; over time I may memorise that  $7 \times 8$  is 56, not another number (my errors were from choosing the wrong alternative within a set). Errors of the second kind can lead to Learning II; over time I may learn that I can work out  $7 \times 8$  not just by trying to remember it (and often committing the first type of error) but, say, from knowing  $7 \times 2$  and doubling twice. My previous errors now can be seen as coming from trying to do the wrong *kind* of thing (for me) in memorising, compared to building on what I know (my errors were from choosing the wrong set of alternatives). NB What counts as ‘wrong’ in the example above, and in any instance, is relative to individuals and context.

When teachers speak judgmentally in the first phase of video watching, my feedback to them indicates that they are making this second kind of error. I am not questioning the interest or validity of what they say, but what I feedback to them is that they have made an error in terms of the *kind* of thing they are saying – they have made a choice from the wrong set of alternatives and, described in this way, the paradox seems to dissipate. My judgments are at a different ‘logical’ level to the communications and judgments about the video and so do not conflict with them.

Making the shift that teachers show they have done, in the evidence above, is evidence of Learning II – they have made a shift in the *way* they go about learning from video. When working with teachers of mathematics on video my aim is, precisely, to support a new way of acting and seeing. I want to allow for the emergence of new descriptions and, with those new descriptions, a possibility for new actions (see Coles 2013, 2014). The intention is to provoke Learning II and it is perhaps no surprise that so many research projects report that learning from using video is hard to facilitate. The kind of learning we are aiming for *should* be hard because, as humans, we can get ingrained in the set of alternatives from which we choose, in any given context.



A website has been created with resources to support facilitators in using video ([www.mathsvideoclubs.ac.uk](http://www.mathsvideoclubs.ac.uk)). We hope in the future to track the influence of these video clubs on teachers' developing practice and the on going learning of facilitators.

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